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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,404	01/14/2002	Bernard M. Werner	HI03027USU P02017US	2074

34408 7590 09/15/2009

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ART UNIT	PAPER NUMBER
2614	

MAIL DATE	DELIVERY MODE
09/15/2009	PAPER

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RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BERNARD M. WERNER

Appeal 2009-003277
Application 10/046,404
Technology Center 2600

Oral Hearing Held: August 12, 2009

Before KENNETH W. HAIRSTON, JOHN C. MARTIN and BRADLEY W. BAUMEISTER, Administrative Patent Judges

ON BEHALF OF THE APPELLANT:

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The above-entitled matter came on for hearing on Wednesday, August 12, 2009, commencing at 10:09 a.m., at The U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Ashorethea Cleveland, Notary Public.

THE USHER: Good morning. Calendar Number 37, Appeal Number 2009-3277. Mr. Perez.

JUDGE HAIRSTON: Counselor, use the podium.

MR. PEREZ: Good morning. My name is Enrique Perez. I represent the Applicant in this case; in this case, claims one through eight and eleven through 28 of US Patent Application Number 10/046,404, entitled, "Constant Coverage Waveguide."

Claims presently stand as rejected as anticipated by Klayman, US Patent Number 3,930,561, titled, "Low Distortion Pyramidal Dispersion Speaker."

Anticipation requires that a reference teach or disclose each and every limitation recited in the claims. Klayman does not teach or disclose each and every limitation, claims one through eight and eleven through 28.

Specifically, in rejecting the claims, the Examiner erred by disregarding features and misinterpreted the meaning of certain terms.

Claim one is directed to a constant coverage waveguide. The waveguide, as like most waveguides, has a throat at the narrow end through which the sound is delivered and the mouth which is the wide end through which the sound exits.

The portion between the mouth and the throat is the actual waveguide part that guides the sound waves through the waveguide. It's the shape of the waveguide that controls the direction of the wave and the dispersion of the sound.

In the recited subject matter, the constant coverage waveguide, claim one, the waveguide has a continuous, three-dimensional, least-energy surface coincident with four control curves.

JUDGE MARTIN: Mr. Perez, can I interrupt you?

MR. PEREZ: Sure.

JUDGE MARTIN: I want to know what the least-energy surface is. How do I know that I have a least-energy surface?

MR. PEREZ: Well, in terms of the present claim one, the least-energy surface is one where there's no discontinuity to the surface.

JUDGE HAIRSTON: How do you know when you have arrived at that though?

MR. PEREZ: Well, it's when you have the control curves defining the surface between the throat and the mouth, are defined by one curve. So, that makes the surface continuous between a throat and a mouth and the surface is being defined by the curves.

Now, that's a good question because that pretty much distinguishes this claim one over Klayman. Klayman is a section waveguide.

There's three sections. There's a first section which is the main section where the transducer is attached. You can refer in my brief at Figure B. The waveguide is shown in Klayman and I've defined where the sections are.

The first section is a mating section. The second one is a cone-shaped, driver, coupling section and the third section is a sound to intercoupling section.

Klayman teaches that the first two sections are conical shaped. The mating section and cone-shaped, driver coupling section are cones and they're kind of in reverse. The mating section compresses the sound and the cone-shaped, driver coupling section expands the sound according to the shape of a cone.

The third section is the sound intercoupling section and Klayman recites that as being exponentially shaped and also the mouth is square-shaped which provides the square mouth and the round throat section.

However, between each section there's a discontinuity. The cone-shaped section is defined by -- if you want to use the term control curves, it would be a linear-control curve. Then at the end of the cone section, however, there's a discontinuity that transfers to an exponentially-shaped inner surface.

JUDGE MARTIN: Let's talk about the discontinuity between the mating section and the cone-shaped driver section. Isn't the mating section designed to receive the transducer? Is that really part of the waveguide? How much of this do we have to consider to be the acoustic waveguide? Can we start it where the mating section meets the cone-shaped driver coupling section?

MR. PEREZ: Yes, you can do that.

JUDGE MARTIN: So, you get rid of one discontinuity?

MR. PEREZ: Right.

JUDGE MARTIN: Okay. And then we move on to the other end of the cone-shaped driver section and we get curved shaping but that seems to be a gradual transition. Do you call that a discontinuity of those two curves?

MR. PEREZ: It is a discontinuity specifically because of the difference in the shape, the inner surface between the two sections.

JUDGE MARTIN: So, even though it's a smooth transition, you're saying that's a discontinuity?

MR. PEREZ: Well, it's a discontinuity because it's not really a smooth transition. I mean, it may appear as such from the drawings.

JUDGE MARTIN: Oh, I see what you mean. You're saying we can't assume that it's rounded?

MR. PEREZ: Exactly.

JUDGE BAUMEISTER: What's your definition of discontinuity?

MR. PEREZ: My definition of discontinuity is based on what the specification teaches is a point or in this case a two-dimensional shape at which the inner surface is defined by a different function.

JUDGE BAUMEISTER: Ah, you're saying different function?

MR. PEREZ: That's correct.

JUDGE BAUMEISTER: So, it's not like you see a line of demarcation between the two surfaces. You're saying -- well, no, you couldn't see it. You're saying, if it's a different function, it's a discontinuity?

MR. PEREZ: Exactly. The actually being able to see the line is really not relevant.

JUDGE BAUMEISTER: Where is there any supporting spec for this version of --

MR. PEREZ: Well, first of all, it's in the claim itself. It states that the inner surface is coincident with the four curves and the four curves are each a single mathematical function, and I can tell you where in the spec that's laid out; but the four curves define the inner surface and the curves also intersect the circular throat and the non-elliptical control surface defines the mouth.

JUDGE MARTIN: Are you saying that the curve has to be the single function? Is that maybe what's going on here?

MR. PEREZ: I think that could be the source of the confusion by the Examiner and the error because basically it has to be one function.

JUDGE BAUMEISTER: And it could be linear?

MR. PEREZ: It could be linear; yes.

JUDGE BAUMEISTER: So, in claim two though, it says wherein the continuous three-dimensional least-energy surface is free of discontinuities. If you're defining least-energy surface as having no discontinuities, isn't claim two redundant or a doctrine of -- claim differentiation tells me there's a presumption that claim one is broader than --

MR. PEREZ: Well, that would be correct -- I'm sorry. Could you repeat --

JUDGE BAUMEISTER: You had just said your definition of least-energy surface means that the surface has to be free of discontinuities.

MR. PEREZ: Right.

JUDGE BAUMEISTER: Claim two says, "wherein" -- further limits claim one and says, "wherein the continuous three-dimensional least-energy surface is free of discontinuities."

MR. PEREZ: Then that would be correct. It would be duplicative and we would be deleting claim two --

JUDGE BAUMEISTER: In claim 13, if you want to turn to claim 13, the next-to-the-last line, the least-energy surface -- I'm sorry. Claim eight, "the continuous surface minimizing the formation of discontinuities."

MR. PEREZ: Well, in claim eight, I would distinguish that by -- I think there is even reference in the spec. I would distinguish that by the goal being the quality control issue.

To be more precise, a discontinuity is anything in the inner surface that would change the path of the wave. So, if there's a scratch or a dent or something in the surface or if it's bent in a certain way that violates the control curves then that would be discontinuity.

So, I would read claim eight as being more of a quality control goal.

JUDGE MARTIN: But if claim seven already requires that you have no discontinuities, how does minimizing something that is already not there -- how is that possible?

MR. PEREZ: Well, in terms of a quality control issue, it would be something that would be unintentional, a discontinuity that is unintentional.

JUDGE MARTIN: I'm afraid I'm getting lost here. So far we have been talking about least-energy surface and discontinuities and we also have the word "continuous" in the claims, some of the claims.

So, the discontinuity you're talking about is not -- we're not talking about the word "continuous?" We're talking about the term "least-energy surface?" So, it sounds like maybe we're talking about the same thing two different ways. What's the difference?

MR. PEREZ: The difference would be that the term "continuous" provides a means of obtaining a least-energy surface that's taught by the spec.

JUDGE BAUMEISTER: So, you're saying continuous -- we're really talking about one thing? Continuous and least-energy surface; it's all one. That's just one limitation. You're saying that it's free of discontinuities?

MR. PEREZ: That's correct.

JUDGE BAUMEISTER: So, it's sort of redundant?

MR. PEREZ: It's a little redundant.

JUDGE BAUMEISTER: I had interpreted continuous to mean devoid of diffraction slits like the prior art had. In the background you say, it was known to have the conical ones that were -- that you didn't get good coverage but you didn't get the sound pull away from the wall and then conversely you had the constant coverage, acoustic waveguide -- I'm sorry. Let's see.

Okay. So, anyway, in one you have the circular one and in the other one you had the flared one that had the flat tops and bottoms.

MR. PEREZ: Right.

JUDGE BAUMEISTER: In that one you have the diffraction slit?

MR. PEREZ: Right.

JUDGE BAUMEISTER: And your invention was to try to get one that was not this elliptical shape without having the diffraction slit?

MR. PEREZ: That's correct.

JUDGE BAUMEISTER: I thought continuous meant just continuous all the way from the mouth to the throat without any slits or openings.

MR. PEREZ: Well, technically, a diffraction slit would be a discontinuity; and yeah, you're correct. The goal is to use the waveguide without such diffraction slits.

JUDGE BAUMEISTER: That would violate both the terms in the claim language. If you had diffraction slits, it would not be continuous and also would not be a least-energy surface; right?

MR. PEREZ: Well, actually, the diffraction slit would violate the fact that it's a round throat.

JUDGE BAUMEISTER: All right. You've lost me there.

MR. PEREZ: Well, the idea of the throat being round is that the sound is being generated in its full -- most sound transducers are round and the entire energy is packed into the source of the waveguide. As it flares out according to the control curves, it flares out in a pattern that covers a room horizontally, and perpendicularly and vertically as desired instead of being round where a lot of energy is really wasted by going up and down and not being spread out evenly.

The Klayman transducer teaches that by starting out with a cone section and ending in a square mouth and if necessary they teach using a diffraction slit which basically is a section around the mouth that further directs the sound in a square pattern.

In waveguide number one there's no need for the diffraction slit and instead of having a conical section that drives the sound at its most powerful point, it's essentially round at the source and it's formed along the waveguide to disperse in its rectangular pattern. I don't know if that clears it up.

JUDGE BAUMEISTER: Well, I'm still having a problem with understanding these terms. I just don't know how broad “least-energy surface” is. I mean, what would somebody reading the spec do to inform them what the scope of that term is? There are some examples given in the spec but I don't see a definition.

JUDGE HAIRSTON: On page seven of the spec, you talk about mathematical equations but where are the equations?

MR. PEREZ: Well, they're referred to. The mathematical definitions that may be used for the control curves is convergent-divergent, control curves, rational B-line, hyperbolic curves.

JUDGE BAUMEISTER: The issue is when you're wrapping the surface around the four sides. In what manner can you wrap it and still be deemed to be a least-energy surface? And page seven of the spec is the only discussion I see of examples of what may be a least-energy surface. If you turn to page seven of the spec, paragraph 24.

MR. PEREZ: Okay.

JUDGE BAUMEISTER: My reading of that is, the least-energy surface may either be what is truly the least possible energy surface achievable or it's good enough that you do a modeling representation and that you're somewhere in the ballpark and that's good enough.

MR. PEREZ: The second approach is more accurate, I would say, as long as it's free of discontinuities.

JUDGE BAUMEISTER: But if you're doing just a mathematical representation or estimation, couldn't you still have discontinuities that are -- you know, it's not the very least but it's close because we can represent it with this general curve?

MR. PEREZ: Well, the idea is that the curve is the same kind of curve from the throat to the mouth so that you don't start off with a conical curve and switch to an elliptical curve.

JUDGE BAUMEISTER: Well, I know you don't want to go to the elliptical curve but I thought the whole point was anything non-elliptical. So, it could be square. It's a two- or three-dimensional curve geometry for the mouth. So, you want it to go square just as long as you don't do it with sharp corners?

MR. PEREZ: The whole idea is that the curve be the same curve from the throat to the mouth. In other words, it would be in a

two-dimensional sense because the control curves are defined as being at the opposite points on a vertical axis and horizontally axis.

So, the idea is that that control curve is the same from the throat to the mouth and there's no change or discontinuity between the throat and the mouth that would make it a different curve.

JUDGE BAUMEISTER: But that goes to the curve. You could have four continuous curves but still make these sides with a discontinuity on the corner. That wouldn't be a least-energy surface. If I take the old rectangular speaker from what we see in the MASH series that curve up and down and bottom, top, right and left -- they have corners. They're not curved; right?

MR. PEREZ: Well, as long as the corner is not part of the mouth. The structure Klayman has specifically -- in other words, it stops flaring at the edge of the mouth and it becomes basically a rectangular frame and that's where it disperses. In a claim waveguide, it just stops at the mouth and whatever shape comes after the mouth then that's what it's to be. I don't know if that helps.

JUDGE BAUMEISTER: Just a few more questions. Going back to Klayman, you said that section 12 could be treated as being separate from the waveguide. My question is, why can't section 20 similarly be treated as the mouth and only section 14, the conical section, be treated as the waveguide?

MR. PEREZ: That's not what Klayman teaches. Klayman teaches that you have two different sections or different sections.

JUDGE BAUMEISTER: Yeah; and they call it a conical section and a --

MR. PEREZ: Exponential.

JUDGE BAUMEISTER: Exponential section. Whether we call it an exponential section or exponential mouth, what's in the term? Why can't the waveguide be considered being limited to the conical section?

MR. PEREZ: I understand what you're saying. The idea is that the mouth is the point at which the waveguide stops; and Klayman does not teach that the waveguide stops at that interface between the cone-shape and exponential section.

In fact, that would be what Klayman describes in the prior art as being sufficient. The cone-shaped section is round at the -- from a front view, it's round. That would just be another cone-shaped waveguide which is the prior art that Klayman teaches is sufficient.

JUDGE BAUMEISTER: So, how wide can the mouth be? Is it just the edge surface? I mean the spec says it's the end. It says, the end surface. It's a three-dimensional structure; isn't it?

MR. PEREZ: The mouth would be -- basically, it's the point at which the waveguide stops and the sound continues into a space.

JUDGE BAUMEISTER: So, just the edge?

MR. PEREZ: That's correct.

JUDGE BAUMEISTER: I thought the spec said just the end. Did it define the end as the edge?

MR. PEREZ: I think one of ordinary skill in the art would understand that the mouth is the point at which the sound exits the waveguide and enters into the air.

JUDGE MARTIN: Well, pursuing that line of thought for just a second, it sounds to me like claim one says that there is a surface that defines the mouth, that these control curves intersect the surface that defines

the mouth. So, it seems like the surface that defines the mouth in Klayman is -- I think this is numeral 28. It's where the exponential part stops and then there's a region. The dispersion lip, is it?

MR. PEREZ: Yes.

JUDGE MARTIN: And that has an inner circle that looks like it's labeled "28" in figure 3. So, why isn't that the claim surface that defines the mouth because the claim doesn't require that the curve go all the way to the very edge. It says it just intersects the curve, the surface that defines the mouth.

MR. PEREZ: I understand what you're saying. However, even if you were to read it that way, the fact of the matter is, there is still a discontinuity between the exponential section and the conical section, and that's really the main distinction here.

JUDGE BAUMEISTER: I guess I have one last question. I see some of the independent claims say that the first control curve is symmetric. The bottom acts as a second control curve, and you're envisioning right and left, top and bottom symmetry.

To me, the claim doesn't preclude any radial symmetry. Is that correct? I mean, is it not possible for this claim to read on a circular throat and a circular mouth?

MR. PEREZ: It's not possible, no, and the reason why is that claim one states that a control curve that intersects a circular throat and a non-elliptical throat controls surface that defines the mouth.

JUDGE BAUMEISTER: Yes. Non-elliptical. You're saying a circle is not an ellipse?

MR. PEREZ: A circle is an ellipse.

JUDGE BAUMEISTER: Okay. Well, in your spec, you describe in the prior art how you had circular mouths and they have one phenomenon associated with it and then they also need to have elliptical ones that had the problem of pulling away from the side wall. So, I thought your spec distinguished the circle and the ellipse?

MR. PEREZ: Actually, the spec specifically says that a circle is an ellipse where basically the two -- I'm forgetting my geometry here. Let me find the specific citation here.

(Pause.)

MR. PEREZ: I'm sorry. I do not --

JUDGE BAUMEISTER: Okay. For example, page three discusses constant coverage, acoustic waveguides. These constant coverage, acoustic waveguides are the ones with the circular mouths?

MR. PEREZ: Right.

JUDGE BAUMEISTER: And then on page four it says at paragraph ten, "other approaches that realize approximate solutions for acoustic waveguides with the coverage angles," that different horizontal and vertical planes are typically formed from elliptical" -- so, it's elliptical mouth? So, to me, it sounds like an elliptical mouth is a different approach from the circular mouth.

MR. PEREZ: Well, the next sentence says that the elliptical shape is used for approximate solutions for wave equations because the circle is an ellipse with both the major and minor diameters equaled to the diameter of the circle.

JUDGE HAIRSTON: Any other questions?

JUDGE BAUMEISTER: No.

JUDGE HAIRSTON: Can I get you to sum up right quick? Anything further?

MR. PEREZ: Yes. Basically, Klayman does not anticipate claim one because Klayman does not teach continuous inner surface and does not teach every single limitation.

Thank you very much.

JUDGE HAIRSTON: Thank you, counsel.

(Whereupon, at approximately 10:37 a.m., the proceedings were concluded.)